Advances in Biometrics for Secure Human Authentication and Recognition

Edited by Dakshina Ranjan Kisku
Phalguni Gupta • Jamuna Kanta Sing

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We dedicate this book to our parents.

Preface

The uniqueness of the physiological and behavioral characteristics of human beings is used to facilitate the identification or verification process, and it always results in correct classification. However, the distinctive evidence obtained from an individual does not guarantee a 100% matching be performed to the biometric characteristics corresponding another subject, even after considering all aspects of accurate recognition process. Tampered sensors, distorted evidence, recognition at a distance, and sometimes, motion of the target subject cause the identification process to be a weak one. Moreover, picking up the right algorithms for image enhancement, feature extraction, matching, classification, and decision in a biometric system are critical. Most of the commercial, off-the-shelf biometrics systems together cannot deal with all the intrinsic perspectives that could easily make the system unstable. Therefore, to cope with this problem, we should consider standard biometrics properties and algorithmic paradigms for the identification or verification of human beings. Hence, experiments of biometric systems at large with various biometrics traits could be a good approach to identify the correct and secure human recognition system. This book is a collection of biometrics solutions, which include both unimodal and multimodal biometrics. Also, it includes up-to-date biometrics algorithms with novel feature extraction techniques, computer vision approaches, soft computing approaches, and

machine learning techniques under a unified framework used in biometrics systems.

This book has attempted to showcase some of the latest technologies and algorithms for human authentication and recognition. Recent developments made in pattern classification and image processing techniques have motivated researchers and practitioners to design cutting-edge biometric technologies and gain competitive advantages over conventional security applications by applying innovative thoughts and algorithms for real-life authentication problems. The need for biometrics systems is increasing tremendously in day-to-day activities such as airport security, medical diagnostics, ATM security, border security control, electronic data security, E-commerce, online banking transactions, cellular phones, national ID cards, drivers' licenses, corpse identification, criminal investigation, etc. The novel methods of biometric systems are evolving rapidly and boosting research areas in new directions. The book provides up-to-date reviews of intelligence techniques and theories used in biometric technologies for human authentication and identification.

The primary audience for the book includes researchers, scholars, graduate students, engineers, practitioners, and developers who work in biometrics and its related fields. We hope our efforts are able to benefit our readers.

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